Amendments to the Claims

1. *(Currently Amended)* A monolithically integrated optical network device ~~(20),~~ comprising: a bipolar transistor ~~(10)~~ realized in a silicon substrate ~~(11)~~ that can be biased into an avalanche condition to emit photons; and a photonic bandgap (PBG) structure ~~(22)~~ monolithically integrated with the bipolar transistor ~~(10)~~ to act as an optical wave guide ~~(16)~~ for the photons emitted by the bipolar transistor ~~(10).~~

2. *(Currently Amended)* The monolithically integrated optical network device ~~(20)~~ of claim 1, wherein the bipolar transistor ~~(10)~~ includes a surface covered in a reflective material ~~(25)~~ that blocks emission of photons through the surface.

3. *(Currently Amended)* The monolithically integrated optical network device ~~(20)~~ of claim 2, wherein the surface includes an optical window ~~(24)~~ that allows photons to pass from the bipolar transistor to the surrounding silicon substrate ~~(11)~~.

4. *(Currently Amended)* The monolithically integrated optical network device ~~(20)~~ of claim 2, wherein the reflective material comprises a ½ λ-layer.

5. *(Currently Amended)* The monolithically integrated optical network device ~~(20)~~ of claim 3, wherein the PBG structure ~~(22)~~ includes a plurality of porous columns ~~(14)~~ realized in the silicon substrate ~~(11)~~ adjacent to the optical window ~~(24)~~ defined on the surface of the bipolar transistor ~~(10).~~

6. *(Currently Amended)* The monolithically integrated optical network device ~~(20)~~ of claim 5, wherein the plurality of porous columns are arranged to define a channel ~~(16)~~ that provides the wave guide for the photons emitted through the optical window.

7. *(Currently Amended)* The monolithically integrated optical network device ~~(20)~~ of claim 1, wherein the emission of light from the bipolar transistor is regulated by a control system ~~(29).~~

8. *(Currently Amended)* The monolithically integrated optical network device ~~(20)~~ of claim 1, wherein the bipolar transistor ~~(10)~~ is fabricated from a material selected from the group consisting of: SiGe, SiGeC, InP, and GaAs.

9. *(Currently Amended)* The monolithically integrated optical network device ~~(20)~~ of claim 1, wherein the silicon substrate is fabricated from a material selected from the group consisting of: CMOS, SiGe, SiGeC, and BiCMOS.

10. *(Currently Amended)* A monolithically integrated optical network ~~(13),~~ comprising: a bipolar transistor ~~(10)~~ realized in a silicon substrate ~~(11)~~ that can be biased into an avalanche condition to emit photon pulses; a photonic bandgap (PBG) structure ~~(22)~~ monolithically integrated with the bipolar transistor ~~(10)~~ in the silicon substrate ~~(11)~~ that acts as an optical wave guide ~~(16)~~ for the photon pulses generated by the bipolar transistor ~~(10);~~

and a receiving device ~~(27a-d)~~ realized proximate a distal end of the optical wave ~~(16)~~ guide for receiving the photon pulses generated by the bipolar transistor ~~(10).~~

11. *(Currently Amended)* The monolithically integrated optical network of claim 10, further comprising a control system ~~(29)~~ for regulating the emission of photon pulses from the bipolar transistor.

12. *(Original)* The monolithically integrated optical network of claim 10, wherein the receiving device comprises a photo diode.

13. *(Currently Amended)* The monolithically integrated optical network of claim 10, wherein the bipolar transistor ~~(10)~~ includes a surface covered in a reflective material ~~(25)~~ that blocks emission of photons pulses through the surface.

14. *(Currently Amended)* The monolithically integrated optical network of claim 13, wherein the surface includes an optical window ~~(24)~~ that allows photon pulses to pass from the bipolar transistor to the surrounding silicon substrate.

15. *(Currently Amended)* The monolithically integrated optical network of claim 14, wherein the PBG structure ~~(22)~~ includes a plurality of porous columns ~~(14)~~ realized in the silicon substrate adjacent to the optical window defined on the surface of the bipolar transistor.

16. *(Original)* The monolithically integrated optical network of claim 15, wherein the plurality of porous columns are arranged to define a channel that provides the wave guide for the photons emitted through the optical window.

17. *(Currently Amended)* The monolithically integrated optical network of claim 13, wherein the reflective material ~~(25)~~ comprises a $\frac{1}{2}\lambda$-layer.

18. *(Currently Amended)* The monolithically integrated optical network of claim 10, wherein the bipolar transistor ~~(10)~~ is fabricated from a material selected from the group consisting of: SiGe, SiGeC, InP, and GaAs.

19. *(Currently Amended)* The monolithically integrated optical network of claim 10, wherein the silicon substrate ~~(11)~~ is fabricated from a material selected from the group consisting of: CMOS, SiGe, SiGeC, and BiCMOS.